Scenarios for STAR Off-line Data Processing

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1. Introduction

This document describes some scenarios to be used in the off-line data processing for STAR. The motivation for describing these scenarios is to better define the requirements for the off-line data handling and processing system. Each scenario corresponds to one type of processing (a job) or a subset of a processing job. Generally these scenarios fall into the major categories of simulation, calibration, event reconstruction, physics analysis, and administration. The scenarios listed are certainly a subset of all that will be required but hopefully there are enough to define the system requirements. A major reference for these scenario descriptions is "STAR Off-line Simulations and Analysis Software Design" by the SAS group, R. Ray, editer.

2. Simulation scenarios

The simulation scenarios apply to running event generators, gstar, detector simulation.

2.1 Preparing event generator configurations

1. Talk to Ron and generate config file
2. Run a few events with this config
3. Analyze output to verify config

2.2 Running event generators

1. Select event generator configuration
2. Specify number of events, optional random number seed
3. Submit job to queue
4. When completed, check log file for errors & verify data
5. Note completion status in production database.

2.3 Preparing and verifying geometry descriptions

2.4 Converting magnetic field survey to gstar/analysis maps

2.5 Preparing gstar configurations

2.6 Running gstar (geant)

2.7 Verifying gstar output

2.8 Preparing detector simulator configurations

2.9 Running detector simulations

2.10 Verifying detector simulation output

3. Calibration scenarios

3.1 Generate TPC spatial distortion correction

3.2 Generate TPC dE/dx correction

1. Select runs.
2. Run tracking.
3. Analyze momentum vs. truncated mean amplitude scatter plot
4. Fit dE/dx parameters to plot
5. Store parameters in database.
6. Enter range of validity of parameters in database.

3.3 Generate TPC bad channels

3.4 Generate TPC 10-8bit conversion map

3.5 Generate TPC time offset correction

3.6 Generate TPC global alignment

3.7 Generate SVT spatial distortion correction

3.8 Generate SVT gain correction

3.9 Generate SVT bad channels

3.10 Generate SVT time offset corrections

3.11 Generate CTF gain corrections

3.12 Generate CTF bad channels

3.13 Generate CTF time offsets

3.14 Generate EMC gain corrections

3.15 Generate EMC bad channels

4. Event reconstruction scenarios

4.1 Define wish list

1. Get priorities from physics committee

4.2 Prepare "ready set" list (data ready)

1. Query database on ready status and priority list.
   Select * from ERprep where run.config.beam=”something”
   and run.config.time>”earliest” and run.config.time<”latest”
   and run.status=”OK” order by “priorities”;
2. Label ready list with a job sequence name.

4.3 Prepare event reconstruction configuration (code ready)

1. Set up program initialization script to load all necessary modules.
2. Have detector and analysis partition groups set up module control switch settings labeled with job sequence name.
3. Have groups prepare monitoring histogram descriptions.
4. Generate job request template with job sequence name, output path, etc.

4.4 Generate first level DST data

1. Produce a job request based on the named template.
2. Submit job request.
3. Verify that job starts running.
4. Monitor status occasionally.

4.5 Verify DST data

1. Select some data from event reconstruction.
2. Plot summary histograms.
3. Compare summary histograms to reference standards.
4. Have QA officers check verified in database.

5. Physics analysis scenarios

5.1 Define user level wish list

1. Create user defined query object class.
2. Store a set of these query objects in the database, each containing individual selection criteria.
3. Add this set of query objects to a named query collection.

5.2 Prepare "ready set" list

1. Execute user defined query (from query object collection)
2. Store result of query as a named index to qualified “events”.

5.3 Prepare physics analysis configuration

1. Set up program initialization script to load necessary modules.
2. Set up job request using named index, output path, etc.

5.4 Generate physics summary data

1. Submit analysis job request.
2. Confirm that job runs

5.5 Verify physics summary data

1. Compare summary histograms to reference.

6. Sample queries.

1. Select DST events where
   beam = AuAu200 and
   multiplicity > 3000 and
   num_verticies = 1 and
   abs(z_vertex) < 2 and
   trigger_type = “one I like”.
2. Select DST events where
   beam = pAu200 and
   Ejet > 20 and
   Ephoton > 10 and
   Ecal < 40
3. Select uDST events where
   K0mult > 30 and
   beam = AuAu30 and
   period = FY01 and
   luminosity > 20 and